The split-comparative hypothesis and the morphology of comparative adverbs in Czech

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Abstract

This paper investigates complex allomorphy patterns in comparative adjectives and adverbs in Standard Czech and two of its dialects. We formulate an account of the allomorphy (including microparametric variation) within the Nanosyntax framework (Starke 2018). We argue that in order to capture the facts, we need to adopt two proposals. The first one is a split CMPR hypothesis (Caha et al. 2019), according to which the comparative head splits into two independent projections, C1 and C2. The second idea is a split ADV hypothesis (hinted at in Bobaljik 2012), according to which there are two positions for an ADV head in the functional sequence.

Keywords: adjectives, adverbs, allomorphy, comparative, morphology, nanosyntax

1   Introduction

This article explores the morphosyntactic relationship between comparative adjectives and comparative adverbs in Standard Czech and two Moravian

dialects (East and Central). The forms under investigation exhibit complex patterns of allomorphy, where the shape of the comparative marker is influenced by two factors. The first factor concerns the (arbitrary) class of the root: the comparative degree is expressed differently for different roots. The second factor is part of speech (adjective or adverb). Czech has a productive way of forming adverbs related to adjectives, including comparative adverbs. The morphology of degree marking is affected by the distinction between an adjective and an adverb in a number of rather complex ways.

   We argue that in order to capture these patterns, we need to adopt two proposals. The first one is the Split-Comparative Hypothesis (Caha et al. 2019). The hypothesis says that the comparative meaning is not atomic, and it should be decomposed into two components of meaning as in (1), where we call the components C1 and C2.

(1)   The Split Comparative Hypothesis:
       comparative = [[[positive] C1] C2]

The hypothesis in (1) follows the standard idea that the comparative is derived from the positive (see, e.g., Bobaljik 2012, Grano & Davis 2018). The new thing about it is that the comparative is not added as a single meaning component, but it is derived by adding two components of meaning.

   The second ingredient we need is a proposal for adverbs. In Bobaljik's (2012) seminal work, it has been proposed that comparative adverbs can be formed in two different ways. In some languages, comparative adverbs are derived from positive-degree adverbs, as in (2a). We call the relevant adverbial head LOADV, since it comes below the comparative. In other languages, comparative adverbs are derived from comparative adjectives (by turning a comparative adjective into an adverb), as in (2b). We call the adverbial head HIADV, since it is found above the comparative.

(2)   Two ways of forming a comparative adverb (Bobaljik 2012)
       a.   [[[A] LOADV] CMPR]
       b.   [[[A]   CMPR] HIADV]

The current paper proposes that the complex patterns of allomorphy in Czech can be explained under the idea that it has both the low and the high ADV head. We call this the split adverb hypothesis. We depict the idea in a simplified form in (3), noting that in the final version of our

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proposal, the CMPR head will have to be split into C1 and C2.

(3)   Our proposal (simplified version)
       [[[[A] LoAdv] cmpr] HiAdv]

The paper is organised as follows. Section 2 discusses the formation of comparative adjectives in Czech, focussing on the fact that the shape of the comparative marker is influenced by the root. Section 2 also presents the account by Caha et al. (2019), which has been designed to explain how exactly the root determines the form of the suffix. In Section 3, we turn to the fact that the comparative marker is not only influenced by the root, but also by the adjective/adverb distinction. These patterns are rather complex and, as we argue, impossible to derive under the idea that Czech only has a single adverbial head. In Section 4, we show how these facts can be explained under the hypothesis that Czech has both a low and a high adverbial head. Section 5 discusses adverbs in the dialects. Section 6 concludes.

2   Comparative adjectives

In this section, we discuss comparative adjectives in Standard Czech. In doing so, we also provide the account of the allomorphic variation proposed in Caha et al. (2019).

The first thing to know is that Standard Czech comparatives are formed by two allomorphs, namely *ějš* or *š*. The allomorph *ějš* is illustrated in (4a), *š* is in (4b).[1]

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[1]There is a small class of adjectives that have a complex base ending in *-k*, e.g., *leh-k-ý* 'easy,' with the comparative *leh-č-í* 'easier.' This form can be interpreted as a zero-derived comparative, where the final agreement marker triggers palatalisation of the *-k* suffix (*leh-k-í → leh-č-í*). However, it is unclear how these forms are derived, since an underlying sequence of morphemes *leh-k-š-í* would also be realised as *leh-č-í* in Czech, as a result of palatalisation and degemination (Caha et al. (2019)). We set these adjectives aside here.

(4)   Two allomorphs of the comparative in Standard Czech

	POS ADJ	CMPR ADJ		GLOSS
a.	chab -ý	chab **-ějš**	-í	'weak'
b.	slab -ý	slab -**š**	-í	'weak'
	root- AGR	root -CMPR	-AGR	

The two adjectives in (4) are similar both in their phonology and their meaning. This indicates that the use of one or the other marker is not uniquely determined by the phonology or the meaning of the base. The decision which roots require *š* and which *ějš* is therefore an idiosyncratic property of the root.[2]

We illustrate the 'arbitrary' nature of allomorph selection in more detail in table (5). In this table, we put side by side adjectival roots that have similar phonology, yet they differ in their comparative allomorphs. In the table, the root on the left (e.g. *star-* 'old' on the first row) always has similar phonology as the root on the right (e.g. *čir-* 'pure'), but the allomorphs differ (see Vyshnevska 2022 for similar observations concerning Ukrainian).

(5)

	POS	CMPR	GLOSS	POS	CMPR	GLOSS
a.	star-ý	star-**š**-í	'old'	čir-ý	čiř-**ejš**-í	'pure'
b.	bohat-ý	bohat-**š**-í	'rich'	svat-ý	svat-**ějš**-í	'saint'
c.	tvrd-ý	tvrd-**š**-í	'hard'	hrd-ý	hrd-**ějš**-í	'proud'
d.	drah-ý	draž-**š**-í	'expensive'	uboh-ý	ubož-**ejš**-í	'poor'

It can be observed that each of the suffixes triggers particular consonant mutations at the end of the base. The comparative marker *š* palatalises velars (see (5d)). The suffix *ějš* palatalizes velars, dentals, alveolars and labials. Palatalisation of the preceding consonant is sometimes marked directly on the consonant (e.g. *ř* in (5a) and *ž* in (5d)). Other times, it is marked on the vowel (as *ě*), yet the effect is the same. For instance, the comparative *svat-ěj-š-í* on line (5b) contains a palatalised root (IPA: svacɛjʃiː).

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[2]Křivan (2012) concludes that frequency plays a role, with more frequent roots showing preference for *š*, as opposed to *ějš*.
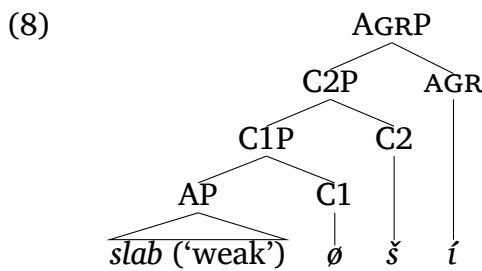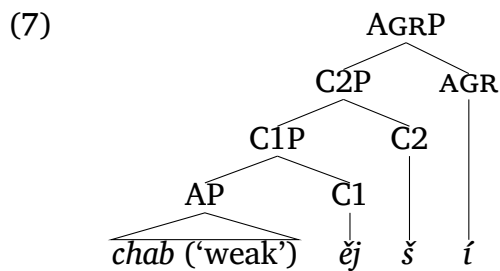
Let us now turn to the form of the two allomorphs, *ějš* and *š*. It has been argued in the literature (Caha 2017, Caha et al. 2019) that the comparative marker *ějš* should be decomposed into two independent morphemes, namely *ěj* and *š*. The first reason is that this explains the (phonological) containment of *š* inside *ějš*, since after the decomposition, *ěj-š* actually contains *š* as a subpart. The second reason is that each of the two morphemes can surface independently. We already saw this in (5), where -*š* can appear without -*ěj*. Conversely, comparative adverbs in Standard Czech lack *š*, and only contain *ěj*, as shown in (6).

(6)   Adverbs in Standard Czech

CMPR ADJ	CMPR ADV	GLOSS
chab-**ěj**-š-í	chab-**ěj**-i	'weak'
rychl-**ej**-š-í	rychl-**ej**-i	'fast'
červen-**ěj**-š-í	červen-**ěj**-i	'red'
hloup-**ěj**-š-í	hloup-**ěj**-i	'stupid'

These fact support the idea that -*ěj* and *š* are independent morphemes.

Caha et al. (2019) propose that the morphological complexity of the comparative marking indicates that the comparative meaning is also complex, and requires the addition of at least two semantic ingredients. Caha et al. (2019) call these C1 and C2, proposing that each of these meaning components heads an independent projection, as in (7). The morphemes *ěj* and *š* are the realization of these meanings.[3]

(7)

```
                AGRP
              /      \
           C2P       AGR
          /    \      |
       C1P      C2    |
      /    \     |    |
     AP     C1   |    |
    /  \    |    |    |
chab ('weak')  ěj   š    í
```

(8)

```
                AGRP
              /      \
           C2P       AGR
          /    \      |
       C1P      C2    |
      /    \     |    |
     AP     C1   |    |
    /  \    |    |    |
slab ('weak')  ø    š    í
```
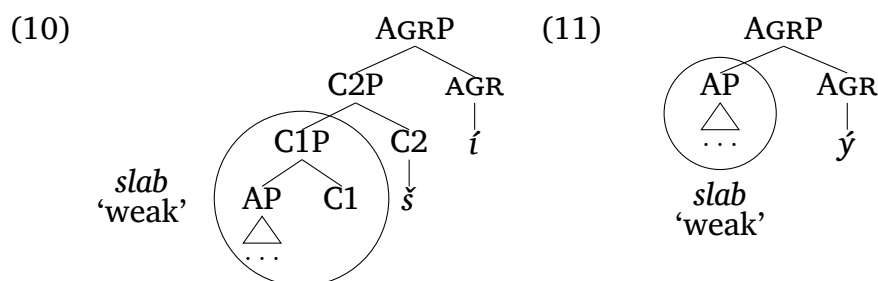
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[3]In the semantics literature, a complex meaning for the comparative has been proposed, for instance, in Kennedy & Levin (2008). In their approach, the adjective base corresponds to a measure function, from which a derived measure function is constructed in the comparative, followed by the application of a POS head that turns the derived measure function into a property.

Let us now turn to the class of adjectives that only have *š* in the comparative. With these adjectives, C1 remains unexpressed in the surface string. A standard way to express the fact that C1 is silent is to propose that it is realized by a special zero allomorph of *ěj*, see (8). The insertion of the zero would be only available in the context of selected roots, which is encoded by the rule (9).

(9)   A context-sensitive rule
   C1 $\Leftrightarrow$ Ø / __ {$\sqrt{\text{SLAB}}$, ...}

Building on Starke (2018), Caha et al. (2019) propose an alternative view based on the idea that lexical items (including roots) may lexicalise more than just a single terminal node. Specifically, roots that combine with *š* are proposed to lexicalise not only the adjectival core of the meaning (that is, AP), but also C1. This is depicted in (10), where the root *slab-* 'weak' lexicalises a non-terminal node containing C1P, which contains C1 and AP. As a result, C1 is realised by the root, and the fact that the suffix *-ěj* is absent with these roots follows automatically.
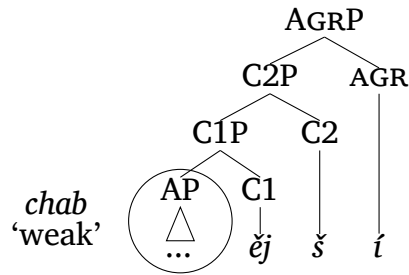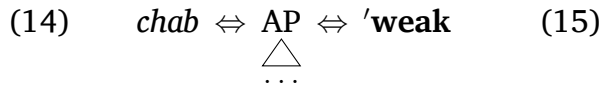
(10)   AGRP   (11)   AGRP

                      C2P   AGR   AP   AGR

                 C1P   C2   í   △   ý
                                                           · · ·
           slab   AP   C1   š
          'weak'   △   *slab*
                     · · ·   'weak'

As Caha et al. (2019) point out, the proposal in (10) is compatible with the fact that the positive degree is realised by the same root *slab* 'weak,' as in (11). This is because of the fact that in the Nanosyntax approach, insertion is driven by the Superset Principle:

(12)   *The Superset Principle* (Starke 2009)
        A lexically stored tree matches a syntactic node iff the lexically
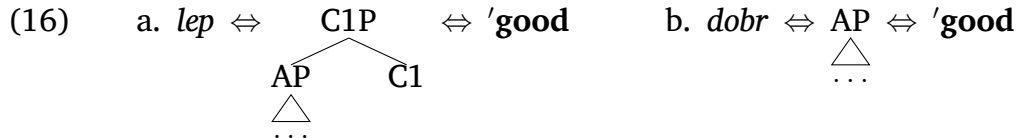   stored tree contains the syntactic node.

To see how this principle works, consider the lexical entry of the adjective *slab-* 'weak' in (13), which connects a phonology (on the left) with a syntactic tree (middle), and a concept (on the right):

(13)   *slab* ⇔   C1P   ⇔ ′**weak**
                    AP   C1
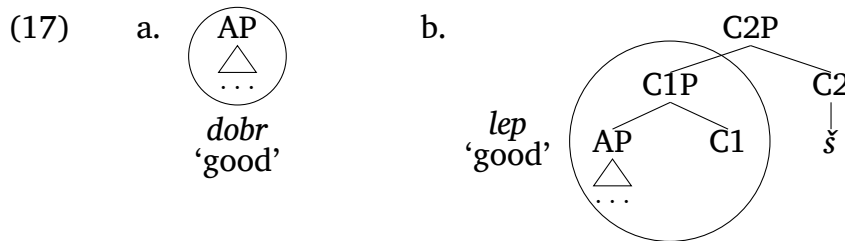   △
                    · · ·
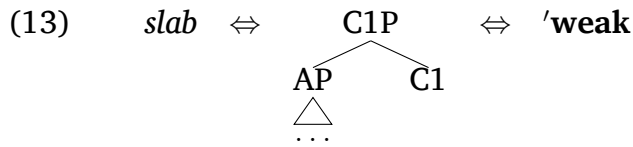
The tree associated with this root is of size C1P, which contains the AP. It can therefore lexicalise either C1P, as shown in (10), or AP as in (11). If a root is lexically specified as just an AP, as in the entry for *chab* 'weak' (see (14)), it cannot realise C1P, because it does not contain C1P. As a result, C1 must be realised by *ěj*, see (15).

(14)   *chab* ⇔ AP ⇔ ′**weak**   (15)   AGRP
                      △   C2P   AGR
                      · · ·   C1P   C2
                                                          AP   C1
                                          chab   △
                                          'weak'   ...   *ěj*   *š*   *í*

Suppletive adjectives such as *dobr-ý – lep-š-í* 'good – better' have two lexical entries as in (16). We assume that the adjectives are suppletive by virtue of being associated with the same concept.[4]

(16)   a. *lep* ⇔   C1P   ⇔ ′**good**   b. *dobr* ⇔ AP ⇔ ′**good**
                     AP   C1   △
                     △   · · ·
                     · · ·

These lexical entries will give rise to the lexicalisation of the positive and the comparative as shown in (17), with the root *dobr* 'good' in the positive, and the root *lep* 'bett' in the comparative.

(17)   a.   AP   b.   C2P
              △   C1P   C2
              · · ·   AP   C1
              dobr   *lep*
              'good'   'good'   AP   C1   *š*
                                              △
                                              · · ·

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[4]Caha et al. (2019) use pointers as a way of linking two suppletive roots to each other. We do not discuss pointers here for reasons of space.

The take-home message is that Caha et al. (2019) use root size to model the type of allomorph that each root combines with. This leads to a simplification of the rules of exponence that describe the realisation of the c1 head (*ěj* or zero). Moreover, the approach provides a way to deal with root suppletion in an elegant way, since C1P sized roots lexicalise different features in the positive and in the comparative. The analysis of suppletion correctly predicts that all suppletive adjectives will be in the *š-í* class (Caha et al. 2019). With this background, let us now turn to the discussion of comparative adverbs.

3 Comparative adverbs in Standard Czech

This section shows how adverb formation influences the marking of the comparative. Table (18) (repeated from (6) above, but with the positive forms added, for reasons to be made clear below) gives the standard forms of comparative adverbs corresponding to *ěj-š-í* adjectives.

(18)   Adverbs of *ěj-š-í* adjectives Standard Czech, positive included

Cmpr Adj	Cmpr Adv	gloss	Pos Adj	Pos Adv
chab-**ěj**-š-í	chab-**ěj**-i	'weak'	chab-ý	chab-ě
rychl-**ej**-š-í	rychl-**ej**-i	'fast'	rychl-ý	rychl-e
hloup-**ěj**-š-í	hloup-**ěj**-i	'stupid'	hloup-ý	hloup-ě

The table illustrates the fact that all the *ěj-š-í* adjectives form adverbs in *ěj-i*. Caha et al. (2019) propose an account where the structure of the adverb has both C1 and C2 (despite the absence of *š*). In addition, there is an Adv head above C2, see (19).

(19)

ADVP

C2P   ADV

C1P   C2   ⌣ -i

AP   C1

△
...   ěj

chab
'weak'

(20)

ADVP

C2P   ADV

C1P   C2   ⌣ -i

AP   C1

△
...

slab
'weak'
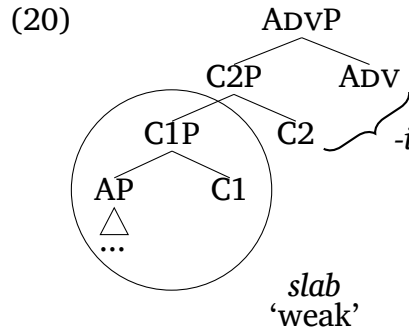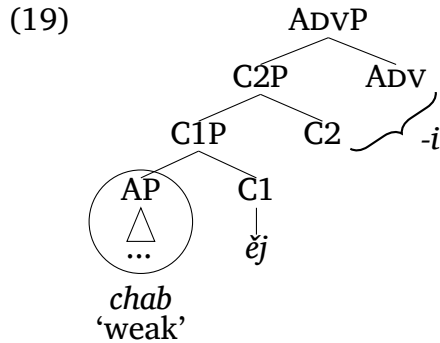
The reason why *š* is not present in (19) (despite the presence of C2) is because it is blocked by the adverbial ending *i*, which is a portmanteau that spells out the C2 projection along with the high ADV head. This is indicated by the brace in (20).[5] The idea that the ending *i* is a portmanteau for C2 and ADV is supported by the fact that adverbs in the positive never have *i*; they have the adverbial ending *ě* instead. This ending is different because it does not lexicalise C2. This can be seen in Table (18) on the right.

The theory proposed in Caha et al. (2019) thus successfully deals with adverbs corresponding to *ěj-š-í* adjectival comparatives, using a structure with a high Adv head. However, the account faces difficulties with the *š-í* class of comparatives, where it wrongly predicts adverbs like **slab-i* 'weak'. To see why this is the case, consider (20). The root of *š-í* adjectives will realise AP + C1 (recall the adjectival comparative in (10)). This leaves C2 + ADV, which will be realised as *-í*, precisely as in (19), yielding forms like **slab-í* 'weak'. The comparative adverbs we do get in the adjectives with *š-í* are of two types, with the type depending on the root. The first (most common) type of adverb is shown in Table (21). The adverb is morphologically identical to the adverbs formed from *ěj-š-í* comparatives.

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[5]The Superset Principle implies that lexicalisation is subject to a constituency requirement. The astute reader will notice that the C2 and ADV heads in (19) do not form a constituent which excludes the other heads. The reason for this is that we depict lexicalisations in an informal way using a brace. In actual fact, lexicalisation is driven by the Spellout Algorithm (Starke 2018). Application of this algorithm will require C1P to move from within the AdvP, so that C2 and Adv form a constituent. For reasons of space, we ignore these technical details.

(21) Standard Czech comparative adverbs (*š-í* adjectives, Class 1)

CMPR ADJ		CMPR ADV	GLOSS	POS ADJ	POS ADV
slab	-š-í	slab-**ěj**-i	'weak'	slab-ý	slab-ě
tuž	-š-í	tuž-**ej**-i	'tough'	tuh-ý	tuz-e
tvrd	-š-í	tvrd-**ěj**-i	'hard'	tvrd-ý	tvrd-ě

The fact that *ěj* appears in the adverbs corresponding to *š-í* adjectives is mysterious. In the system proposed by Caha et al. (2019), it is expected that whenever a particular head can be spelled out by the root, then this type of realisation must be preferred to other ways of realizing it.[6] This is ultimately the reason why comparative adjectives like *slab-š-í* 'weaker' lack *ěj*: since the root can spell out C1, *ěj* is not needed. Therefore, the class of adverbs in (21) is problematic because *ěj* surfaces in the adverb with roots that can lexicalise C1.

The marker *ěj* in fact shows a complex distribution, being sensitive both inwards (to the identity of the root), and outwards (to the final morpheme of the comparative). It is sensitive to the root, because it does not appear in the context of a selected class of roots. However, this is so only when the form is used as an adjective, but not when an ADV head is introduced higher up, in which case *ěj* must appear again. We shall show below how the postulation of a second, low ADV head explains this complex distribution.

The second class of comparative adverbs corresponding to *š-í* comparatives is shown in Table (22). This is a minor class, populated mainly by suppletive adjectival comparatives.

(22) Standard Czech comparative adverbs (*š-í* adjectives, Class II)

CMPR ADJ		CMPR ADV		GLOSS	POS ADJ	POS ADV
draž	-š-í	dráž	-e	'expensive'	drah-ý	draz-e
lep	-š-í	lép	-e	'good'	dobr-ý	dobř-e
del	-š-í	dél	-e	'long'	dlouh-ý	dlouz-e

These adverbs come close to the predicted form, because they lack *ěj* just like the corresponding adjectives. With these roots, it appears that C1 is

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[6]This follows from the so-called Spellout Algorithm (Starke 2018).

spelled out by the root both in the adjective and in the adverb.

However, the adverbs also show two unexpected features. First of all, the adverbial marker is not the predicted *i*, but *e*. This may initially look like the adverbial marker that we find in the positive degree, given in the final column in (22). However, we assume that these are different morphemes, since they interact differently with the final consonant of the root. This can be seen with the root *drah* 'expensive,' where we get *draz* in the positive and *dráž* in the comparative. It is known that in the Czech phonology, different endings trigger different palatalisations of the base, and since the palatalisations are different here, these are quite likely to be different *e*'s.

Another noteworthy fact is that the root always lengthens in the comparative adverb in (22), e.g., the adjectival root *drah* 'expensive' is realised as *dráž* in the adverb (the accent on the vowel indicates length). Such lengthening looks as something specific to this class of comparative adverbs, and we shall capture it by proposing that the adverbial marker *e* is accompanied by an empty vocalic space μ, that triggers the lengthening of the root.

To summarise, Caha et al. (2019) posited two classes of roots, yielding two different types of comparative adjectives: *š-í* vs. *ěj-š-í*. When comparative adverbs are introduced, it turns out that there are three classes of roots. This is because the *š-í* class of adjectives splits into two subclasses, where each subclass has a different way of forming the adverb, as we show in Figure 1, where the three arrows correspond to the three classes of adjectives. The notation PAL $+ \mu +$ e represents the fact that comparative adverb suffix *e* triggers palatalisation (PAL) and lengthens the preceding vowel (μ).
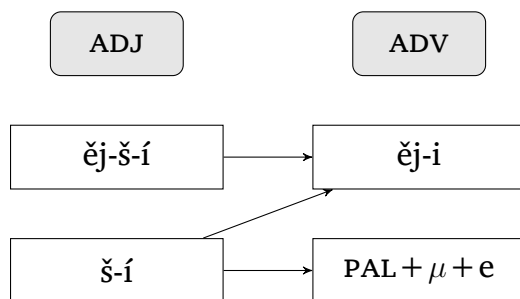

Figure 1: Adjective-adverb pairs in Standard Czech

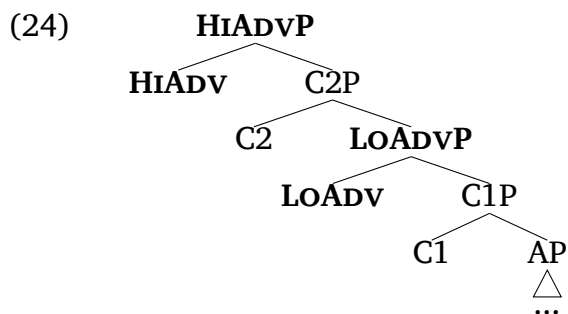The three classes are shown in a different format, with actual forms, in Table (23).

(23) Three classes of comparative ADJs/ADVs in Standard Czech

CMPR ADJ	CMPR ADV	GLOSS
chab-ěj-š-í	chab-ěj-i	'weak'
slab-š-í	slab-ěj-i	'weak'
draž-š-í	dráž-e	'expensive'

We can see that the system is descriptively simple (though analytically challenging, as we already mentioned). There are roots which always show *ěj* (top row, dark shade). Then there are roots which never show *ěj* (bottom row, light shade). And finally, there are 'intermediate' roots, which pattern with the *ěj*-less roots in the adjective, but with the other class in the adverb.

4   Deriving the Standard pattern

In this section, we propose an account that delivers the correct pairing between the adjectival and the adverbial forms. The crucial idea is that adverbs have two additional heads compared to adjectives. Specifically, we propose a low adverb head (LOADV) in between C1 and C2, and a high adverbial head (HIADV) above C2:

(24)
```
            HIADvP
           /      \
       HIADV       C2P
                  /    \
                C2     LOADvP
                      /      \
                  LOADV       C1P
                             /    \
                           C1      AP
                                   △
                                   ...
```

This structure provides enough analytical space to propose more than two sizes of roots, which is empirically required. However, Bobaljik (2012: §4.2) also provides some independent cross-linguistic evidence for two

different positions of an adverbial head in a comparative, which we review briefly below.

Evidence for the existence of a high adverb is based on morpheme ordering in Karelian. Consider the root 'quick' in (25). The comparative marker *mpa* (and its allomorphs) appears closer to the root than the adverbial marker *h* (in bold). This suggests that the adverbial endings sit in a structurally position higher than the comparative *mpa*.

(25) Karelian 'quick' and 'good' (Bobaljik 2012: 118)

| | 'quick' | | 'good' | |
	POS	CMPR	POS	CMPR
ADJ	rutto	rutto-*mpa*	hyvä	pare-*mpi*
ADV	rutto-**h**	rutto-*mpa*-**h**	hyv-**in**	pare-*mm*-**in**

There are reasons to think that *mpa* spells out C2, and therefore, that *h* occupies the high adverb head of (24). The analysis of *mpa* as C2 is suggested by the patterning of suppletive adjectives in Karelian. Consider the forms of the suppletive adjective 'good' in (25). This adjective has the root *hyvä* 'good' for both positive forms and the root *pare* for the comparative forms.[7] Recall now from (17) that Caha et al. (2019) posit slightly different feature specifications for suppletive roots. Following this approach, the suppletive comparative root *pare* 'bett' would be specified as lexicalising AP + C1 (to make it different from the positive *hyvä* 'good,' which spells out just AP). However, specifying *pare* as C1 necessarily leads to the analysis of *mpi* as C2, because it comes on top of the suppletive root *pare* 'bett'. If this is so, the Karelian adverb marker must be hosted by an ADV head that is higher than both C1 and C2, and corresponds therefore to the high adverb head HIADV.

Basque, on the other hand, leads to different conclusions concerning the location of the ADV head. Consider the forms of the root 'new' in (26). We see that the adverbial morpheme *ki* is closer to the root than the comparative *ago*.

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[7]It is not clear why 'quick' and 'good' use slightly different shapes of the functional morphemes. A possible explanation is that Bobaljik relies on multiple sources for Karelian, as revealed by the appendix of his book.

(26)   Basque 'new' and 'good'(Bobaljik 2012: 119)

	'new'		'good'	
	POS	CMPR	POS	CMPR
ADJ	berri	berri -ago	on	hobe
ADV	berri-**ki**	berri-**ki**-ago	on-**gi**	hobe-**ki**

There are reasons to think that *ago* (like the Karelian *mpi*) is the realisation of C2 (Holaj & Starke 2019). If that is so, the facts in (26) give us reasons to think that the adverbial *ki* is lower than C2.

To see why Holaj & Starke (2019) treat *ago* as C2, consider the suppletive pair *on* 'good' and *hobe* 'better,' given on the first row of Table (26). Since *hobe* does not combine with any overt comparative marker, Holaj & Starke (2019) analyse it as lexicalising both C1 and C2. However, in forms featuring the marker *xe* 'a little bit,' *hobe* and *ago* do combine, yielding the form *hobe-xe-ago* 'a little bit better,' see (27).

(27)   hobe   -xe -ago
         better.C1 -bit -C2

Holaj & Starke (2019) suggest that *xe* comes in between C1 and C2. Its intervention prevents *hobe* from lexicalising C2, and *ago* is therefore inserted. The suppletive root *hobe* realises just AP + C1 in (27) (which is allowed by the Superset Principle).

In sum, the patterning of the suppletive adjective 'good' in (27) tells us that *ago* is C2, and therefore, that the adverbial *ki* must be lower than C2. However, we do not know the position of *ki* relative to C1. With this question in mind, let us now turn to the adverbial forms of the adjective 'good' in (27).

The relevant fact in (27) is that in the comparative adverb, the adverbial *ki* attaches on top of the suppletive form *hobe*; the form **on-gi-ago* (with *gi* attaching to the positive AP root) is ungrammatical. This indicates that even though *ki* is lower than C2 (because it is lower than *ago*), it must be higher than C1, else it would not combine with *hobe*. These considerations locate *ki* unequivocally between C1 and C2.

In sum, the two languages discussed here each provide a piece of evidence for a particular location of an ADV head, yet the location is different in each case. Bobaljik (2012) concludes from this that the position of the

ADV head is not fixed. In what follows, we show that if we assume for Czech the simultaneous presence of both of these heads, we are able to correctly model the pairing between adjectival and adverbial allomorphs of the comparative.[8]

With this much in place, we now return to the Czech patterns in Table (28) (repeated from (23)).

(28)   Three classes of comparative ADJs/ADVs in Standard Czech

CMPR ADJ	CMPR ADV	GLOSS
chab-ěj-š-í	chab-ěj-i	'weak'
slab-š-í	slab-ěj-i	'weak'
draž-š-í	dráž-e	'expensive'

We begin with the *ěj-š-í → ěj-i* class on the top row. The roots of this class are lexically specified as APs. The structure of the comparative adjective is given in (29):

(29)   (30)
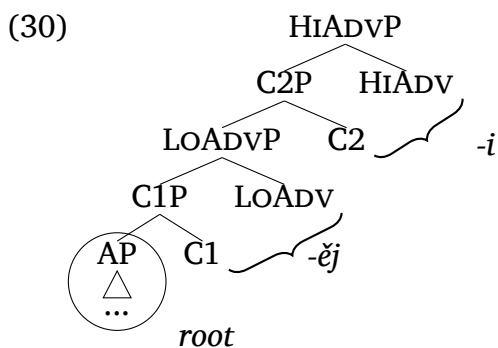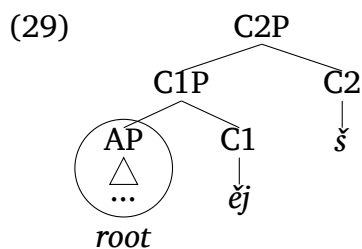
The structure of the comparative adverb is provided in (30), in which two things are worth noting. First, *ěj* spells out the LOADV head along with C1, as indicated by the brace. This is compatible with *ěj* lexicalising just C1 in

---

[8]It is possible to assume that Basque and Karelian have both Adv heads, even though they do not show morphological evidence for this. For instance, if we specify the Basque *-ago* as spelling out [C2 + HIADV], it will function both as a comparative marker in the adjective (spelling out just C2), or as a comparative adverb marker (spelling out C2 + HIADV, with the low adverb head realised as *ki*). As a result, Basque can be analysed as Czech with both hi and low ADV. A similar analysis can be devised for Karelian, where the root can be assumed to spell out not only AP + C1, but also LOADV. We do not elaborate this analysis here as it is orthogonal to our main concern.

the adjectival structure, since C1P is a subconstituent of [$_{\text{LOADVP}}$ LOADV [$_{\text{C1P}}$ C1]] (not shown in the trees, but created through leftward movement of AP in (24); see note 5). Second, the combination of C2 + HIADV is realised as *i*. The other comparative adverb marker *ě* lexicalises just HIADV (as we shall show below). This means that the heads C2 and HIADV could in principle be lexicalised analytically as *š-ě*. However, the Nanosyntax spellout algorithm prefers portmanteau lexicalisation of the two heads by a single morpheme, so *i* is chosen in (30).

Let us next turn to the *š-í* → *ěj-i* class (second row in (28)). This is the class where Caha et al. (2019) wrongly predicted adverbs like **slab-i* 'weaker'. Roots of this class are of size C1P. There is no need for *ěj* in the adjective, since the root spells out C1 (see (31)).

(31) C2P
  C1P   C2
AP   C1 |
△   *š*
...
  root

(32) HIADVP
      C2P   HIADV
   LOADVP   C2   ⌣ *-i*
     C1P LOADV
   AP   C1 ⌣ *-ěj*
   △
   ...
        root
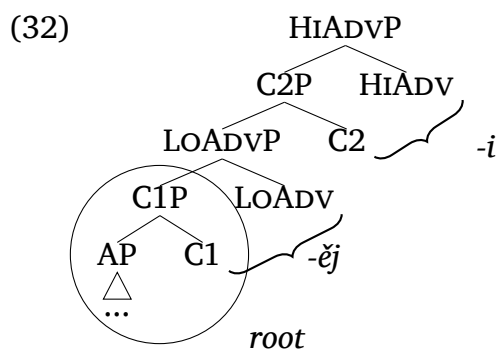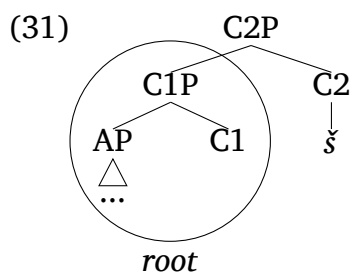
However, in the comparative adverb in (32), *ěj* is the only marker that can spell out LOADV. The marker *i* then appears as the lexicalisation of C2 + HIADV, exactly as in (30). This is then how the problematic class *š-í* → *ěj-i* arises: due to the additional LOADV head, *ěj* is needed in the adverb, even though it is missing in the adjective.[9]

The third and final Standard Czech class is *š-í* → *ě*. It can be captured by associating the root to the adverbial C2P indicated in (34). Such lexical item gives rise to an adverb where the root pronounces all the features except HIADV, which is realised as *ě*.

---

[9]In the adverb, the C1 feature could in principle be lexicalised by either the root or the *-ěj* suffix. The spellout algorithm dictates that in such a case, the root only spells out AP. The *ěj* suffix lexicalises the remnant constituent [LOADV [C1]], out of which the AP (lexicalised by the root) extracts. Technically, the derivation requires backtracking (Starke 2018).

(33)

(34)
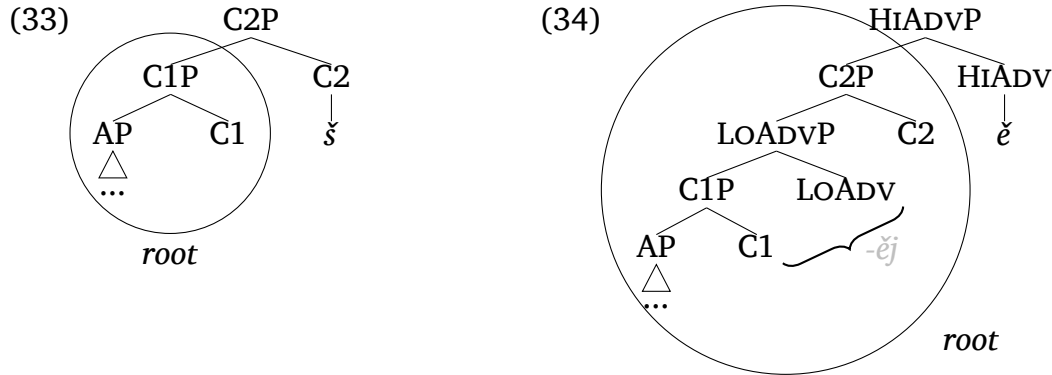
In the comparative adjective in (33), the root cannot spell out C2P, since the C2P of (33) is not a sub-constituent of the root's lexical entry, which has the C2P tree as in (34). This is because the C2P of (33) lacks LoAdv. As a result, the root only spells out C1P, and C2 is spelled out as *š*.

The case of the C2P sized roots reveals an interesting aspect of the nano-syntactic framework. Standardly, an emergence of a head in the morpho-syntactic structure goes hand in hand with the emergence of a morpheme realising that head. This is the case, for instance, in the *š-í → ěj-i* class: the presence of the extra LoAdv head in the adverb leads to the emergence of *ěj* (recall (32)). However, sometimes, the opposite happens, i.e., we find cases where the presence of more features in the morphosyntactic structure leads to the disappearance of a morpheme. This is so in the current case. Here the presence of the LoAdv head in the structure leads to an effect where the adverb root can spell out C2, and the adverb as a consequence lacks *š*. In the adjective, the root cannot spell out C2 because of the constituency issue (the adjectival C2P is not a subconstituent of the lexical entry). The morpheme *š* therefore appears in the adjective only (despite the fact that the adjective has fewer heads).

The three classes of Standard Czech thus correspond to three root sizes: AP, C1P, and C2P. This does not exhaust the logical options: there could be roots of size LoAdvP. Such roots would give rise to a fourth pattern (absent from Standard Czech): *š-í → i*. In Section 5, we shall see that there exist dialects of Czech that have exactly this pattern.

Summarising the discussion of Standard Czech, we conclude that once the LoAdv head is added in the structure, it is possible to formulate an analysis that resolves the two puzzles we encountered. First, it provides a

natural solution for the puzzling *š-í → ěj-i* class, where *ěj* emerges in the adverb due to the need to realise the LoADV head. Second, it provides the analytical space for the two different comparative-adverb markers (*i* and *ě*), such that each marker has a different specification (C2 + HiADV for *i* vs. HiADV for *-ě*). In the next section, we show that this analysis also provides for a neat approach to dialect variation in Czech.

5 Dialect variation

This section shows that a structure with two adverb heads also leads to a natural account of dialectal variation in comparative-adverb formation. Recall first that in the standard language, adverbs are marked by two different vocalic endings; see the leftmost column in Table (35).

(35) Dialectal Variation in Czech

Standard Czech	Apocope Dialects	
	East Morava	Central Morava
i	PAL + μ	
ě		PAL + μ

In a number of Czech dialects, these vocalic endings are absent (Balhar et al. 1997: 379) and comparative adverbs are only marked suprasegmentally, namely by palatalisation and lengthening. Since the adverbial forms diachronically had a vocalic ending (Kosek 2014: 95-6), we call these the Apocope Dialects. The loss of the final vowel affects the marking of the comparative degree in rather complex ways.

In this section, we zoom in on East and Central Morava dialects (Sections 5.1 and 5.2 respectively). Since these dialects lack the final vowel, they also lack the Standard-Czech distinction between *i* and *-ě*, minimally on the surface. However, we argue that they also lack the distinction at a deeper level, in the sense that there has been paradigm levelling resulting in the loss of the Standard Czech distinction, as shown by the shading in (35). What Table (35) also intends to show is the different direction of the levelling: East-Morava has generalised the equivalent of standard *i* (the marker of C2 + HiADV), whereas Central-Morava has generalised the equivalent of standard *ě* (the realisation of HiADV). This single point of

difference interacts with the proposed structures in a way that all the surface differences follow from this.

5.1 East Morava

In this section, we discuss adverbs in the East Morava dialect group. Our main point is to show that East Morava dialects have a uniform comparative-adverb marker, which is the counterpart of the standard *i*. The relevant facts are provided in Table (36) on the left. For ease of comparison, the classes are organised as in the standard language (we list the standard forms on the right).[10]

(36)   East Morava dialect group (data from Hlubinková 2004, 2005)

East Morava			Standard Czech	
CMPR ADJ	CMPR ADV	GLOSS	CMPR ADJ	CMPR ADV
tepl-ej-š-í	tepl-éj	'warm'	tepl-ej-š-í	tepl-ej-**i**
ti(š) -š-í	tiš-éj	'silent'	tiš -š-í	tiš-ej-**i**
dra(š) -š-í	dráž	'expensive'	draž -š-í	dráž **-e**

The table shows that there is no significant morphological difference between East Morava and the standard language regarding the adjectival comparatives. However, we can see that the adverbial forms lack the final vowel. The absence of the final vowel does not entail the absence of marking: we can see that adverbs in East Morava always lengthen the final consonant, either of the suffix or the root (*tepl-éj*, *dráž*). Moreover, if they end in a non-palatal consonant (*drah-ý* 'expensive'), they are palatalised (*dráž*).[11]

---

[10]The forms are given in orthographic form, since the main focus here are not the phonetic details of the dialects, but the morphological structure of the form.

[11]The lengthening of *-ěj* to *-éj* is subject to variation within East Morava (short adverbial forms are also found). Hlubinková (2004) gives forms such as *tepl-éj/tepl-ej* 'warmer.' This contrasts with adverbs such as *dráž* 'more expensively,' which are never short (*draž). We analyse this as a matter of phonology, because it is independently known that the palatalising *ě* often prevents lengthening in contexts where all other vowels show length alternations. For instance, Caha & Scheer (2008) observe that infinitives with a single vowel always lengthen (e.g., *pi-l* 'drank' has the infinitive *pí-t* 'to drink'), but if that vowel is *ě*, it often fails to lengthen (*pě-l* 'sang' has the infinitive *pě-t* 'to sing'). We therefore assume that morphologically, all comparative adverbs lengthen, but *ěj* adverbs may fail to show length for phonological reasons.

Now since in East Morava, lengthening applies to all adverbs, this makes it tempting to propose an analysis with a uniform marking of comparative adverbs, which we show as PAL+μ in Figure 2. This uniform adverbial marker always involves palatalisation in addition to lengthening. Palatalisation cannot be directly observed in the adverbs ending in *-éj*, since *-j* is already palatal, but we can observe palatalisation whenever the base ends in a consonant that can be subject to it (e.g., *drah-ý* 'expensive' *dráž* 'more expensively').
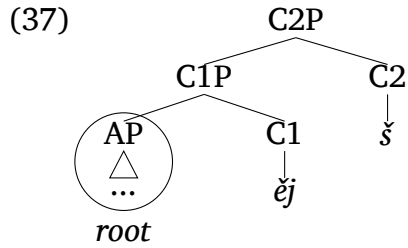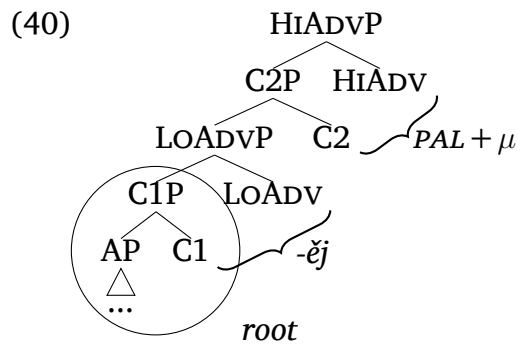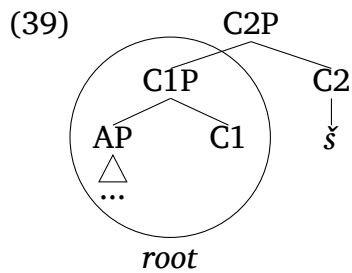
ADJ   ADV

-ěj-š-í   ěj-PAL+μ

-š-í   PAL+μ
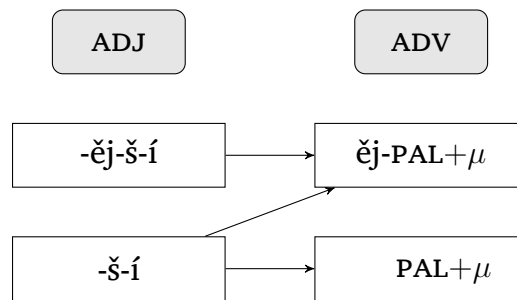
Figure 2: Adjective-adverb pairs in East Morava

Other than having a single comparative-adverb marker (PAL+μ), the East-Morava dialects have a very similar type of pairing between adjectives and adverbs as Standard Czech, with a clear intermediate class that lacks *ěj* in the adjectival comparative, but acquires *ěj* in the adverb. The main point of our analysis is to show that all these classes can be captured assuming a uniform comparative-adverb marker (PAL+μ) that lexicalises C2+HiAdv, which means that it has the same specification as the standard *i*.
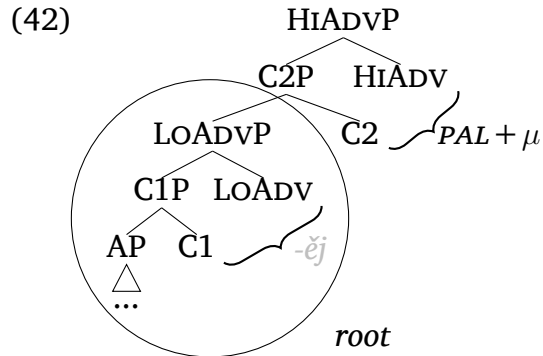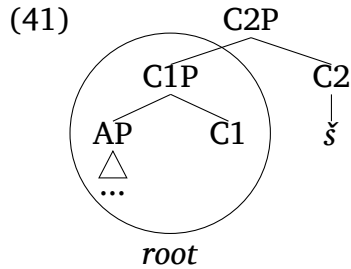
Let us start the analysis with the *ěj-š-í* → *-éj* class. This class is based on AP-sized roots. In (37), we see the adjective, and (38) gives the adverb. The lexicalisation is the same as in the standard language, the only difference being the phonological realisation of C2+HiAdv.

(37)

```
                C2P
         C1P           C2
    AP         C1       š
   (△)         |
    ···        ěj
   root
```

(38)

```
                    HiAdvP
            C2P          HiAdv
      LoAdvP      C2        PAL+μ
   C1P    LoAdv
 (AP  C1)        -ěj
  △
  ···
      root
```
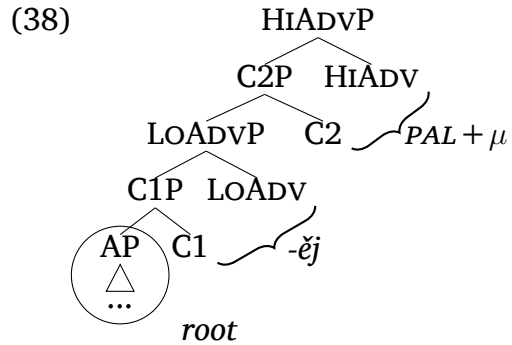
The analysis of the *š-í → -éj* class is also analogous to the standard, and it is based on roots of the size C1P. The structures are shown below in (39) and (40).

(39)

```
                C2P
      ( C1P )         C2
     AP      C1        š
     △
     ···
        root
```

(40)

```
                    HiAdvP
            C2P          HiAdv
      LoAdvP      C2        PAL+μ
   ( C1P    LoAdv )
   AP    C1        -ěj
   △
   ···
        root
```

The final class of roots (*š-í → PAL+μ*) could be of size C2P (as in the Standard), but since a dedicated HiAdv marker like standard *ě* is missing in East Morava, a C2P size root would still pair with the uniform adverb marker PAL+μ. For simplicity, we therefore assume that the roots in question are of the size LoAdvP, as we show in (41) and (42).

(41) C2P
  C1P   C2
 AP C1   š
 △
 ...
   root

(42) HiAdvP
   C2P   HiAdv
 LoAdvP   C2 PAL $+\mu$
 C1P LoAdv
 AP C1 *-ěj*
 △
 ...
     root

This concludes the analysis of the three classes in East Morava Czech. The main point was to show that if we assume a uniform non-segmental PAL $+\mu$ ending, the analogue of Standard Czech *i*, we can easily capture the facts as they are found in East Morava dialects. Aside from the absence of a segmental adverb marker, East Morava differs from Standard Czech only in the size of the roots of the third class, which are of size LoAdv rather than C2P. In the following section, we turn to Central Morava dialects. Our main idea is that the non-segmental ending in Central Morava is the analogue of the standard *ě*, spelling out just HiAdv.

5.2 Central Morava adverbs

In this section, we discuss comparative adverbs found in Central Morava Czech.[12] This dialect group differs from both the standard language as well as the East Morava dialects discussed in Section 5.1 in two important respects. First, it maintains *š* in the comparative adverb (except in class IV; see the third column in (43)). It is also the only dialect type that distinguishes four different classes of roots when it comes to comparative formation.

The main set of facts that we aim to explain are given in Table (43). The table presents the four classes under roman numbers (I-IV), with Class IV exemplified by two adjectives.

---

[12]Similar facts are also found in West Bohemia.

(43)   Central Morava comparative adjectives and adverbs

	POS ADJ	CMPR ADJ		CMPR ADV		GLOSS
I.	chab-ý	chab-**ěj-š**-í		chab-**ěj-š**		'weak'
II.	hrub-ý	hrub-	**š**-í	hrub-**ěj-š**		'rough'
III.	slab-ý	slab-	**š**-í	sláb-	š	'weak'
IV.	drah-ý	draž-	**š**-í	dráž		'expensive'
	dobr-ý	lep-	**š**-í	líp		'good'

The first class is exemplified by the adjective *chab-ý* 'weak.' The comparative adverb *chab-ěj-š* illustrates that in this dialect, adverbs corresponding to *ěj-š-í* comparatives maintain both *ěj* and *š* in the adverb. Apparently, there is no overt adverbial ending, but this does not automatically mean that morphologically speaking, there is no adverbial marking. Possibly, the marking may be non-segmental, namely lengthening, which, however, fails to lengthen the palatalising *-ě* (as discussed in footnote 11).

The second fact that makes Central Morava dialects different is that *š-í* comparatives do not have two corresponding adverbs, but three. These correspond to classes II-IV in Table (43).

Class II has an adjectival *š-í* comparative paired with an adverb in *ěj-š*. The adverb thus looks the same as the adverb corresponding to an *ěj-š-í* adjective (as highlighted by the dark shading). We have already encountered this intermediate class before both in Standard Czech and in East Morava.

Another familiar pattern is found in Class IV. The adverb *dráž* 'more expensively' shows neither C1 *ěj* or C2 *š*, but it undergoes lengthening and palatalisation (which we take to be a non-segmental realisation of the comparative-adverb function). On the bottom row of Table (43), we also include the suppletive adverb *líp* 'better,' which belongs in the same class. We include it because this adverb makes it clear that there is no C2 ending *š*. This is a point that may be spurious in the case of *dráž* 'more expensively,' because one could argue that this is an effect of degemination, and that the underlying morphological structure is *dráž-š*. In this context, *líp* 'better' is a clearer instance of this class, since there is nothing phonologically odd about the ungrammatical **lípš* (certainly, there is no need for degemination here). Note, however, that the root of the adverb 'better' *líp* is lengthened (the comparative adjective being *lep-*). Palatalisation has no effect on the labial.

The final class of *š-í* adjectives is represented by the root *slab-ý* 'weak' on row III. This root has the adverb *sláb-š*, which preserves the C2 marker *š*, while the root also lengthens. This is a new class, which is not found in Standard or East-Morava Czech.
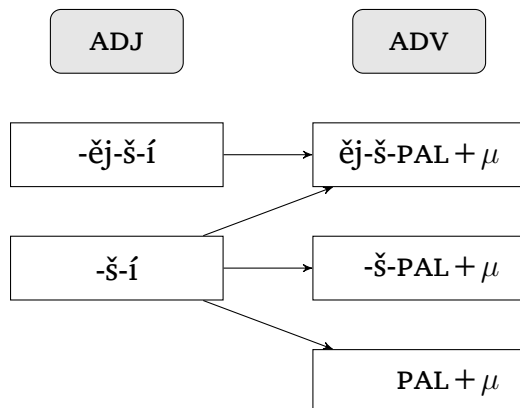
Figure 3 summarises the four patterns.

Figure 3: Adjective-adverb pairs in Central Morava

In the figure, we are again assuming that all classes have a uniform comparative-adverb marker, namely PAL $+\mu$. The evidence for this marker is direct in Classes III and IV of Table (43) (where we observe lengthening), but indirect in the case of Classes I and II. These classes have the *ěj-š* ending, and *-ě* is immune to lengthening (as we have argued in footnote 11). We nevertheless assume that the same comparative-adverb marker is present here too, maintaining the idea that upon losing the segmental endings, the evidence for a distinction between two different adverbial endings is lost, and a single comparative-adverb marker appears in its stead. We shall argue that in Central Morava, this marker is the realisation of HIADV, i.e., the counterpart of the Standard *-ě*. This idea is going to explain why comparative adverbs in this dialect acquire *š* in Classes I-III.

Figure 3 represents the most complex system found in the Czech dialects, and our goal will be to explain both the allomorphs found, and the pairing between adjectives and adverbs, which requires us to operate with four different classes of roots. Our idea is that the four classes of adjective-adverb pairs can be derived under the hypothesis that each class is based on a root of a different size, as shown in (44).
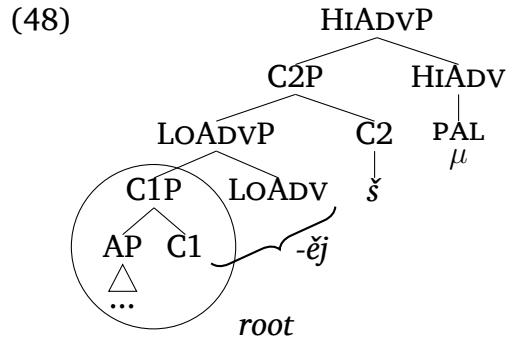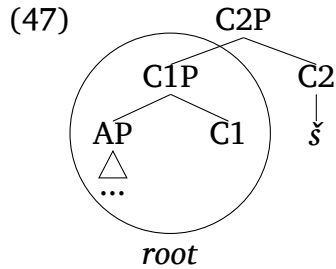
(44)
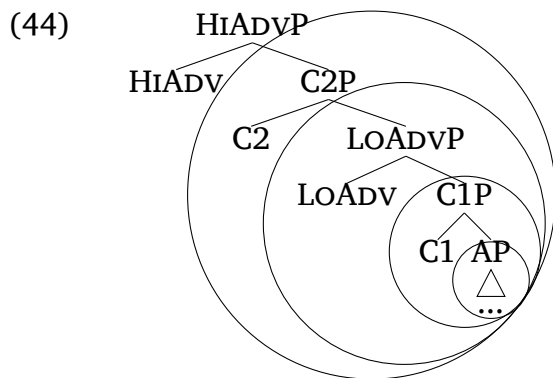
Let us now look at the individual patterns. We begin with the AP-sized roots (Class I). Such roots always need both *ěj* and *š*, yielding the *ěj-š-í* → *ěj-š* pattern. The structure of the comparative adjective is given in (45), C1 is spelled out by *ěj*, and C2 by *š*.

(45)

(46)
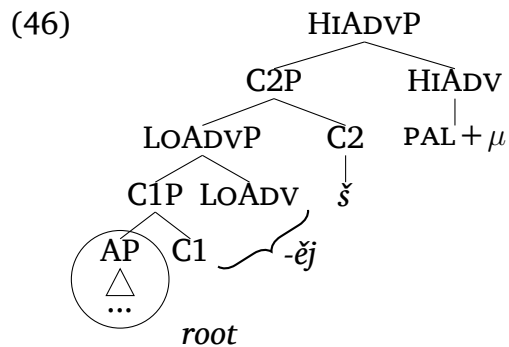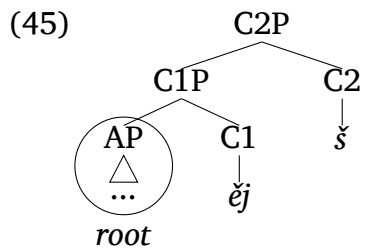
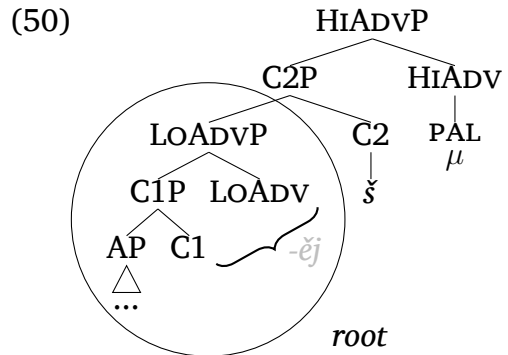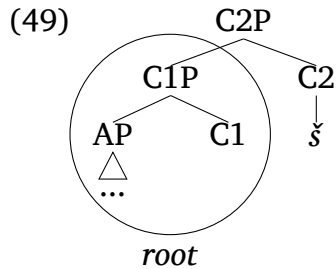The structure of the comparative adverb is provided in (46). The supra-segmental ending only spells out HɪAᴅᴠ, which leads to the emergence of *š* under C2. The morpheme *ěj* spells out C1 and LoAᴅᴠ, as it does in all other varieties.

Let us now turn to roots of size C1P (Class II). In the adjectival structure, these roots spell out C1P, and they therefore do not need *ěj*: their adjectival comparative is just *š-í*.

(47)

```
          C2P
      ┌────┴────┐
    ( C1P )     C2
   ( ┌──┴──┐ )   │
   ( AP   C1 )   š
   ( △      )
   ( ...    )
      root
```

(48)

```
                    HiAdvP
              ┌───────┴───────┐
            C2P             HiAdv
        ┌────┴────┐           │
    LoAdvP        C2         pal
  ( ┌───┴───┐ )    │          │
  ( C1P  LoAdv)    š          μ
  (┌─┴─┐      )
  ( AP  C1 ⌣-ěj)
  ( △        )
  ( ...      )
        root
```

However, in the adverb structure, these roots still need *ěj*, because something must realise the LoAdv head. The rest of the structure is spelled out as in (46). In sum, roots of the size C1P give rise to the *š-í → ěj-š* pattern, with *ěj* appearing due to the low adverb head.

Roots of size LoAdvP (Class III) give rise to the *š-í → š* pattern. We show this in (49) and (50). Starting with the adverbial structure (50), we see that with these roots, there is no need for the marker *ěj*, since the root lexicalises the LoAdv feature, which triggered the presence of *ěj* in the adverbs that have it. However, the root requires the presence of *š*, and it also lengthens, e.g. *slab-š-í → sláb-š* 'weaker'.

(49)

```
          C2P
      ┌────┴────┐
   ( C1P        C2 )
   ( ┌──┴──┐    │  )
   ( AP   C1    š  )
   ( △          )
   ( ...        )
      root
```

(50)

```
                    HiAdvP
              ┌───────┴───────┐
           C2P             HiAdv
      ( ┌────┴────┐            │  )
      ( LoAdvP    C2          pal )
      ( ┌───┴───┐  │           │  )
      ( C1P  LoAdv š           μ  )
      ( ┌─┴─┐         )
      ( AP  C1 ⌣-ěj   )
      ( △             )
      ( ...           )
            root
```

The very same root can also spell out just C1P in the adjectival structure (49), because this is a sub-constituent of the LoAdvP; hence, spellout of C1P in (49) is allowed by the Superset Principle. The comparative marker *ěj* remains absent here too since the root lexicalises C1.

Finally, Class IV roots are of size C2P (where this C2P includes the LoAdv head). They do not need either *ěj* or *š* in the comparative adverb,

as shown in (52). They only undergo lengthening and palatalisation (recall from (43) the length difference between *draž-š-í → dráž* 'more expensive'; or *lep-š-í → líp* 'better').[13]

(51)

(52)
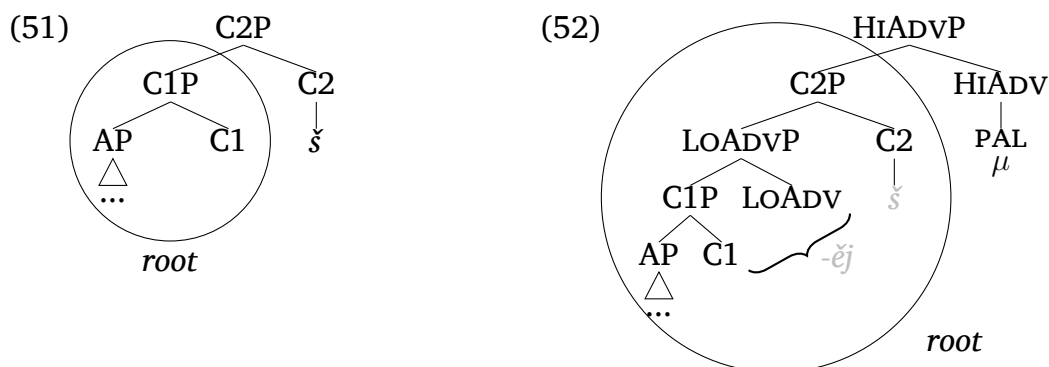
In the comparative adjective in (51), the root spells out only C1P, and C2 is therefore spelled out as *š*. The root cannot spell out C2P in the adjectival structure (51), since this is not a sub-constituent of the root's lexical entry. The lexical entry of the root corresponds to the adverbial C2P, and since the adjectival C2P lacks LoAdv, it is not a subconstituent of the adverbial one. As a result, the root can only spell out C1P in the adjective, and this leads to the emergence of *š* under C2 in (51).

5.3 Summary

This section has shown that the system developed to handle Standard Czech (with two adverb heads and a split comparative) can be extended to capture various dialects of Czech. The main idea of the analysis is that due to the lack of a segmental ending, the dialects use a single non-discriminate adverbial ending. Our idea is that in some dialects (exemplified by East Morava), the single surviving ending is the counterpart of the standard *i*. In other dialects (Central Morava), it is the counterpart of *ě*. Different types of adverbial marking arise as an automatic consequence of this simple distinction. The final point we want to stress regarding this section

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[13]The raising of *e* to *i* under lengthening is productive in most Czech dialects, including Central Morava, and we are thus assuming that *líp* 'better, ADV' is a lengthened version of the adjectival root *lep*. Alternatively, we could also analyse *lip* as a suppletive adverbial root spelling out C2P (including the LoAdv head), while *lep* would be just C1P.

is that the rich structure with two adverb heads and a split comparative allows us to capture the fact that there are four different classes of roots in Central Morava. The rather complex system of pairing between adjectival and adverbial comparatives in this dialect falls out as an effect of root size, with no need to say anything special beyond characterising the individual roots in terms of what features they are capable of realising.

6   Conclusions

In this article, we investigated the complex system of pairing between comparative adjectives and comparative adverbs in Standard Czech and Czech dialects. We have provided a formal model of how this pairing is achieved for each variety, and we have also identified a plausible source of differences among the varieties: while Standard Czech has two different endings (*i* and *e*), the dialects only have a single ending. This single ending came to exist due to paradigmatic levelling on the one hand, and phonological erosion on the other, whereby the segmental vocalic adverbial endings got eliminated in the dialects. The difference in the direction of the levelling lead to different systems of adverb formation.

  We could achieve this result by adopting the following ideas.

(53)   a.   The comparative meaning is distributed across two
             projections, C1 and C2
        b.   There is both a low and a high adverbial head
        c.   Lexicalisation targets non-terminals. Which lexical
             item realises which head is determined by the Spel-
             lout Algorithm of Starke (2018)
        d.   Roots belong to different classes. These can be mod-
             elled by attributing to each root a different number
             of functional features in the lexicon

Once these assumptions are adopted, the allomorphs that each root combines with in the adjectival and in the adverbial comparative are a function of the root's specification, in combination with the proposals (53ac).

  As a final note, we observe that in achieving this result, the proposal does not rely on complex context-sensitive rules. Consider, for instance, the distribution of *-ěj* in adjective-adverb pairs such as *draž-š-í — dráž-*

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e 'more expensive' and *slab-š-í – slab-**ěj**-i* 'weaker.' On the surface, we observe the following: 'C1 (the position of exponence for *ěj*) is always realised as zero when attached to roots such as *drah*; but with the root *slab*, it is zero only if the form is an adjective, but not an adverb. Else, C1 is realised as *ěj*.' Thanks to phrasal lexicalisation, zero morphemes (with such complex distributions) play no role in our account, which we take to be a notable achievement of the analysis.

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